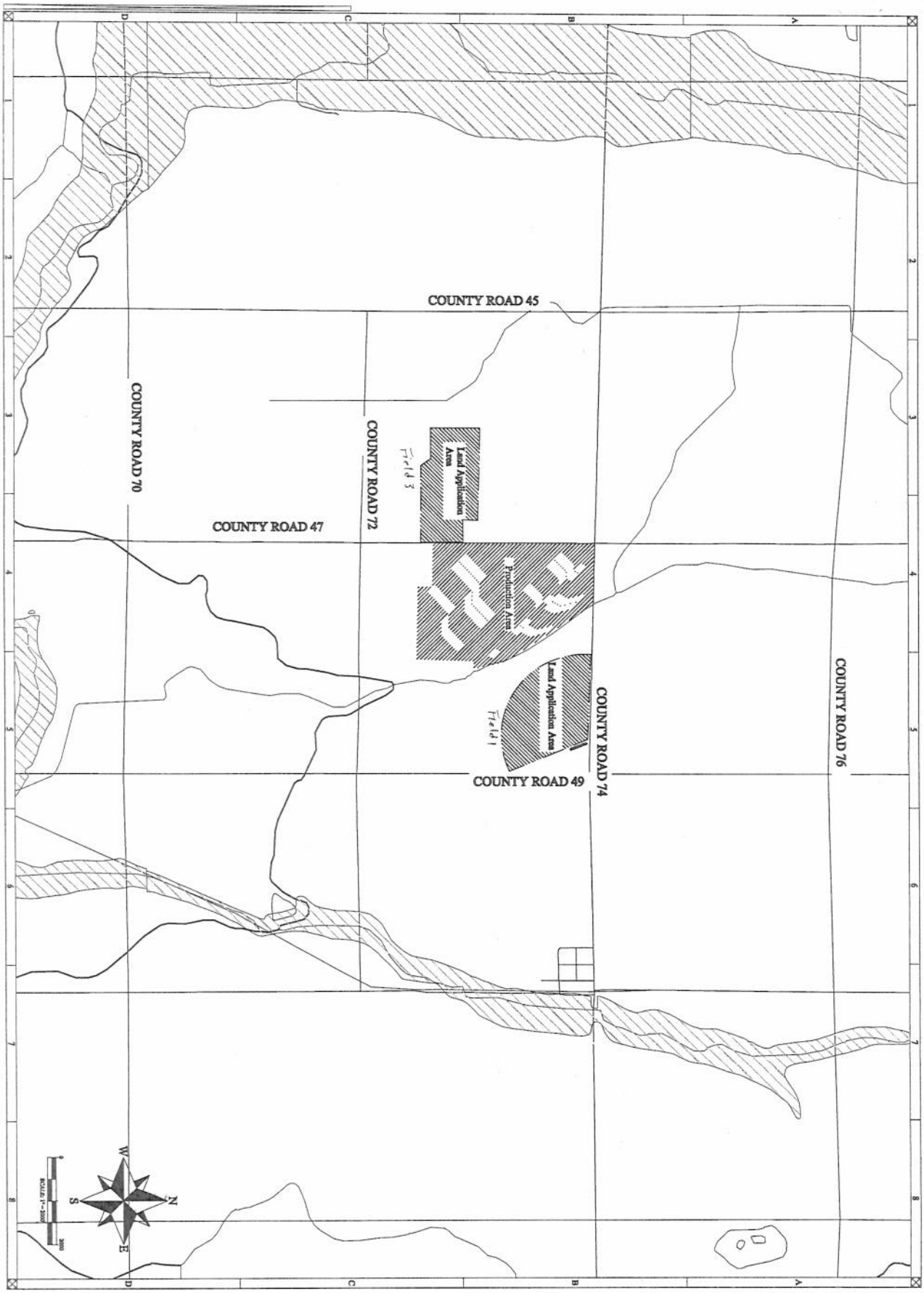
APPENDIX A

NUTRIENT MANAGEMENT PLAN TERMS (1 – 6)

1) LAND APPLICATION FIELD MAPS



JOHNSON DAIRY, LLC.
NMP APPENDIX A

LOCATED IN THE WEST 1/2 OF SECTION 1, TOWNSHIP 6 NORTH, RANGE 65 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO

SHEET: A

1 OF 1

JF CATTLE
CAFO ATTACH A

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APPENDIX B

NUTRIENT MANAGEMENT PLAN TERMS

2) LAND APPLICATION INFORMATION

NMP TERMS - 2) LAND APPLICATION FIELDS

All land application fields are listed below.

Table B-1 – Land Application Fields

Field Identification	Latitude[1]	Longitude[2]	Spreadable Acres[3]
Field #1	40.521236	-104.605156	110
Field #3	40.513110	-104.623792	70[3]

[1]Enter latitude in decimal degrees.

[2]Enter longitude in decimal degrees [number should be negative (eg. -104.3315)].

[3]Field acreages reduced by any setbacks, buffers, or otherwise unspreadable areas.

NMP TERMS - 2) LAND APPLICATION CROPS

Potential crops or other uses for each land application field are listed below.

Table –B-2 – Potential Land Application Field Crops

Field Identification	Crop	Realistic Yield Goal	Yield Unit (bushels, tons, etc.)	Source (see Appendix C)
All	Corn silage – single crop	28	Tons	Farm, county
All	Triticale silage	12	Tons	Farm, AGPRO, County
All	Corn silage – double crop	24	Tons	Farm
All	Sorghum silage	20	Tons	CSU FS
All	Millet	35	Bushels	State
All	Oat Silage	14	Tons	County, calc
All	Corn Grain	201	Bu	County Stats
All	Alfalfa	5.3	Tons	County Stats
All	Sorghum grain	65	Bu	County Stats
All	Sudex silage	10	Tons	CSU FS
All	Sudex hay	5	Tons	CSU FS
All	Triticale hay	5	Tons	County Stats, Calc
All	Wheat silage	12	Tons	County Stats, Calc
All	Wheat hay	5	Tons	County Stats, Calc
All	Winter wheat grain	71	Bu	County Stats
All	Spring wheat grain	62	Bu	County Stats
All	Oat hay	5.2	Tons	County Stats, Calc
All	Oat grain	91	Bu	County Stats
All	Pasture/grass/hay	4.7	Tons	County Stats
All	Sugar Beets	30.1	Tons	County Stats
All	Sunflower	1348	Lbs	County Stats
All	Dry Beans	2255	Lbs	County Stats

DL indicates dryland production, Irr indicates irrigated production
***Double crop corn is based upon two years of farm data. No other data is available for a double crop yield goal and this is below average for a single crop yield.**

APPENDIX C

NUTRIENT MANAGEMENT PLAN TERMS

3) EXPECTED CROP YIELD INFORMATION

Yield goals are based upon a variety of sources and are indicated in Table B-2:

Field: an average of the last 5 years of suitable data, plus10%. Years where yields were affected by drought, hail, insufficient nutrient availability or water, or other problems which would cause unnatural yield loss will not be included.

Farm: where a 5 year average does not exist but data from surrounding fields which are of similar productivity do exist, these yields will be included in the 5 year average. This is also the case where a whole farm yield is monitored rather than yields on individual fields. Where data on individual fields is kept but yield is similar across the farm, the data may be pooled together for simplicity.

Where a 5 year average has not been determined, one of several methods for determining yield goal, depending upon the availability of information, will be used.

- County or State Stats - Ag statistics for the county and crop – 5 years of data + 10%
- AGPRO - data from nearby farms, 5 years + 10%
- CES-FS - Cooperative Extension bulletin 568A or a production publication plus 10%

Calc: calculations will be used if a grain yield goal is known but not a forage yield goal for the same crop, based upon the following data:

Olsen Lab – "Guidelines for Fertilizer Recommendations, Plant Tissue Analysis, and Water Analysis" (available at their website www.olsenlab.com)
Oat hay yield goal (t/a) x 17.5 = grain yield goal (bu/a)
Forage sorghum yield goal (t/a) x 20 = grain yield
Sorghum silage yield goal (t/a) x 6 = grain yield

Servi-Tech Lab (Crop File 1.02.022 attached)
Corn silage yield goal (t/a) x 7.5 = grain yield, although this will vary with moisture and quality.
Small grain hay (t/a) x 14 = grain yield
Small grain silage (t/a) x 6 = grain yield

Triticale yields will be based upon potential wheat yield if Triticale yields are not known (KSU fact sheet MF-2227)

If millet is grown, it will be planted and harvested as a forage, but until more information regarding yield is available, it will be fertilized per average grain yield. Research from North Dakota State University indicates that their forage yields from 2 years of data coupled with protein content removed the same amount of N as would be applied if fertilized for grain using Colorado data.

APPENDIX C

NUTRIENT MANAGEMENT PLAN TERMS

3) EXPECTED CROP YIELD INFORMATION

Farm/AGPRO yield goal calculations

Triticale

Year	Yield	Source
2011	13 tons	Farm
2009	10 tons	Farm
2008	9.4 tons	AGPRO
2007	73 bu wheat = 12 t	County stats
2003	73.5 bu wheat = 12.3 t	County stats

5 year average = 11.3 x 110% = 12.5 tons/acre

Corn silage, single crop

Year	Yield	Source
2011	28 tons	Farm
2010	25 tons	Farm
2009	25 tons	Farm
2005	26.5	County stats
2003	23.5	County stats

5 year average = 25.6 x 110% = 28 tons/acre

Corn silage, double crop

Year	Yield	Source
2011	22 tons	Farm
2009	22 tons	Farm

2 year average = 22 x 110% = 24 tons/acre

APPENDIX D

NUTRIENT MANAGEMENT PLAN TERMS

4) NUTRIENT BUDGET INFORMATION

Formulas are provided using recommendations from Cooperative Extension offices from Colorado and surrounding states. Recommendations from Olsen Lab, Servi-Tech Lab, and Midwest Lab may also be used, with the most current formulas provided in this NMP. Any one of these formulas or laboratories might be used to make a recommendation for a given crop in a single year, but two different formulas will not be used at the same time to make in season adjustments for the same crop. All of these laboratories are regionally based. They consider the recommendations from surrounding land grant universities as well as the most current research available. Colorado Cooperative Extension has found Midwest Lab's and ServiTech Lab's recommendations to be comparable to CSU's recommendations (From the Ground Up, Agronomy News, Cooperative Extension, CSU, Vol 24:1, April 2004). Olsen's Lab was not researched. Rather than hand calculating recommendations, the printed results on soil test results from the afore mentioned labs might also be used.

4) NUTRIENT BUDGET INFORMATION (yield goals are presented in Appendices B and C)

Cooperative Extension Nutrient Budget Information:

Crop:	Manure and Process Wastewater Application Rate Calculated Using:	Description of Method to be Used (calculation, look-up table, etc.):
Corn Silage	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	35+(7.5*YG (tons/a) Tables 7A-8 CSU Bulletin #568A
Corn Grain	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	35 + (1.2 * YG (bu/acre)) Tables 7b. CSU Bulletin #568A
Sorghum Silage	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	9 * YG (tons/A) Tables 7d. CSU Bulletin #568A
Sorghum Grain	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	1.2 * YG (lbs/A) Tables 7c. CSU Bulletin #568A
Triticale Hay & Silage	☐ CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines X Department-approved Method	yield goal (lbs/a DM) * (% protein/6.25/100)/.66 multiply silage yield by 0.4 to get dry matter of silage N content/efficiency use factor Where protein is not known, 9% is used (KSU Bulletin MF-2227)
Oat Hay & Silage	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (tons wet)*2000 lb/t*1.6% N/100 Multiply silage yield by 0.4 to get dry matter of silage Crop removal CSU 568A.
Spring Seeded Small Grain	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	125 lbs N per 100 bu/A, minus 20 lb N/a for each 10 bu/A difference CSU Do-It-Yourself Manure Mgt Plan
Winter Wheat Grain	☐ CSUCE Published Fertilizer Suggestions X Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (bu/a) * 1.75 KSU Bulletin C-529 Wheat Production Handbook, 1997

4) NUTRIENT BUDGET INFORMATION

Cooperative Extension Nutrient Budget Information:

Crop:	Manure and Process Wastewater Application Rate Calculated Using:	Description of Method to be Used (calculation, look-up table, etc.):
Wheat Silage	☐ CSUCE Published Fertilizer Suggestions X Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	Convert yield to grain and fertilize as for grain KSU Bulletin MF-1072 Small Grain Cereals for Forage
Alfalfa	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	((YG*2000)*(% Protein/6.25)*(soil factor))/0.66) Soil factor 0.5-0.7 for sandy to clay soil, respectively CSU Soil Publication #0.565 & 0.566
Sudangrass/ Sudex Hay	☐ CSUCE Published Fertilizer Suggestions X Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (tons/a DM) * 40 lbs N/ton KSU Bulletin MF-1036
Sunflowers	X CSUCE Published Fertilizer Suggestions X Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	YG (lb/a) * 0.065 lbs N/lb grain High Plains Sunflower Production Handbook
Grass/hay	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	185 lbs N/ton – 40 lbs N per ton for each ton yield goal less than a 4 ton yield goal (N credit to 1' soils sample) Reference is CSU 568A.
Small grain pasture and grain	X CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines ☐ Department-approved Method	(animals/acre) x expected weight gain (lb/hd) x 0.4 = lbs N/a OR (Winter wheat recommendation plus 30-50 lbs N) Soil publication #0.565
Dry beans	☐ CSUCE Published Fertilizer Suggestions ☐ Adjacent State CE-Published Fertilizer Suggestions ☐ CNMP Method that meets USDA-NRCS standards ☐ CO NRCS NMP guidelines X Department-approved Method	Non-irrigated Inoculated - 40 lbs N/acre Non-irrigated Non-inoculated - 70 lbs N/acre Irrigated crops Yield Goal (lbs/a) X .05 NDSU SF-720

4) NUTRIENT BUDGET INFORMATION

Formulas for calculating nutrient budgets

- ☐ CSUCE Published Fertilizer Suggestions
- ☐ Adjacent State CE-Published Fertilizer Suggestions
- ☐ CNMP Method that meets USDA-NRCS standards
- ☐ CO NRCS NMP guidelines
- X Department-approved Method

Olsen Laboratories current formulas, lbs. N/yield unit (where not otherwise specified, multiply by yield goal as presented in Appendices B and C)

Corn silage – multiply silage yield goal by 7 and use grain recommendation

Corn grain – $\frac{(0.90)(\text{YG, bu/a})}{1-(0.0008)(\text{YG, bu/a})} + 50 = \text{lb N/bu}$

Sorghum/Sudex silage – multiply silage yield goal by 6 and use grain recommendation

Sorghum/Sudex hay – multiply hay yield goal by 20 and use grain recommendation

Sorghum grain - (YG)(1.2 N/bu) + 30 lb N

Triticale silage – 10 lb N/ton

Triticale hay –30 lb N/ton

Summer fallow wheat grain – 1.75 lbs N/bu

Continuous wheat grain – 2.0 lbs N/bu (includes nitrogen for stubble decomposition)

Spring wheat grain - (YG)(2.4 lbs N/bu) – (OM-1)*20

Wheat silage – 10 lb/ton

Wheat hay – 30 lb N/ton

Small grain grazing – 40 lbs N/a (not dependent on yield goal)

Oat silage – 9 lbs N/ton

Oat hay – multiply hay yield goal by 17.5 and use grain recommendation

Oat grain – 1.0 lb N/bu

Irrigated grass – 45 lbs N/ton

Dryland grass – 30 lbs N/ton

Sugar beets – (YG)(9 lbs N/ton) – 30*%OM – Residual N*1.67(2' soil sample)

Millet – 1.5 lb N/bu

Sunflower – 0.06 lb N/lb

Dry beans – (YG, bu)(2.0 lb N/bu) (+20 lbs N for kidney beans, -30 lbs N if inoculated, +30 lbs N on sandy soils)

4) NUTRIENT BUDGET INFORMATION

Formulas for calculating nutrient budgets:

- ☐ CSUCE Published Fertilizer Suggestions
- ☐ Adjacent State CE-Published Fertilizer Suggestions
- ☐ CNMP Method that meets USDA-NRCS standards
- ☐ CO NRCS NMP guidelines
- X Department-approved Method

ServiTech Laboratories current formulas, lbs. N/yield unit (multiply by yield goal as presented in Appendices B and C)

Corn silage - 10 lbs. N/Ton
Corn grain – 1.3 lb N/bu
Sorghum silage – 9 lb N/ton
Sorghum hay – 25 lb N/ton
Sorghum grain - 1.2 lb N/bu
Sudex silage – 7.5 lb N/ton
Sudex hay – 25 lb N/ton
Triticale silage – 10 lb N/ton
Wheat silage – 10 lb N/ton
Winter wheat grain – 1.75 lbs N/bu
Spring wheat grain -2.0 lbs N/bu
Small grain hay (triticale) – 26 lb N/ton
Oat silage – 12 lb N/ton
Oat hay – 25 lb N/ton
Oat grain – 1.0 lb N/bu
Pasture/Grass/Native grass – 40 lbs N/ton
Sugar beets – 7.5 lbs N/ton
Millet – 1.7 lb N/bu
Sunflower – 0.05 lb N/lb
Dry beans – 0.04 lb N/lb

4) NUTRIENT BUDGET INFORMATION

Formulas for calculating nutrient budgets:

Midwest Laboratories current formulas, lbs. N/yield unit (multiply by yield goal as presented in Appendices B and C)

Corn silage – 9.5 lbs. N/Ton
Corn grain – 1.3 lb N/bu
Sorghum silage – 7 lb N/ton
Sorghum grain - 1.3 lb N/bu
Sudex hay – 15 lb/ton
Triticale silage – convert yield to grain, use grain recommendation
Triticale grain – 1.5 lb N/bu
Winter wheat grain – 2.3 lbs N/bu
Wheat silage – convert yield to grain, use grain recommendation
Oat grain – 1.2 lb N/bu
Oat silage - convert yield to grain, use grain recommendation
Pasture/Grass/Native grass – 40 lbs N/ton
Sugar Beets – 8.5 lb N/ton
Millet – 1.6 lbs N/bu
Sunflower – 0.06 lbs N/lb
Dry beans – 0.4 lbs N/bu

Nitrogen Credits

Available Nitrogen in Wastewater (CSU Bulletin 568A, plus personal communication)
1st year N availability in wastewater, sprinkler applied (Organic N * 30%) + (NH_4-N * 55%)
1st year N availability in wastewater, flood applied (Organic N * 30%) + (NH_4-N * 78%)
2nd year N availability in wastewater (Organic N * 10%)

Available Nitrogen in Manure (minimum values)
1st year N availability in manure (Organic N * 25%) + (NH_4-N * % available below)
2nd year N availability in manure (Organic N * 10%)

Available Nitrogen in Compost (minimum values)
1st year N availability in manure (Organic N * 20%) + (NH_4-N * % available below)
2nd year N availability in manure (Organic N * 10%)

NH4-N % available, solid manure and slurry (UN NebGuide G1335).
Inject or immediate incorporation – 95%
Incorporate within 1 day – 50-70%
Incorporate 2-5 days – 0-50%
Incorporate >5 days – 0%

The laboratory's plant available nutrient schedule may also be used.

In the near future these mineralization factors may change, and this nutrient management plan will use the revised values from CSU. In fields which receive a similar amount of manure or wastewater each year, the 2 year mineralization rate may be added together and credited all in one year for simplicity.

Legume Credit- Previous crop, alfalfa

>80% stand	100-140 lbs N/A
60-80% stand	60-100 lbs N/A
<60% stand	30-60 lbs N/A

Alfalfa protein to be used in the absence of a forage test (CSU no. 0.565)

Maturity	% Crude Protein	% N
Pre-bud	22-24	3.5-3.8
Bud	20-22	3.2-3.5
Early bloom	17-19	2.7-3.0
Midbloom	14-16	2.2-2.6
Full bloom	<14	<2.2

Additional nitrogen needs

Crop decomposition

Up to 20 lbs/A additional nitrogen may need to be applied to carbonaceous crop residues.

Starter fertilizer

Regardless of the recommendations for nutrient application, up to 35 lbs of N and 35 lbs P_2O_5 may be added as a starter fertilizer at or just prior to planting in order to ensure nutrient availability to seedlings, promoting a more vigorous plant more capable of utilizing nutrients already in the soil. Any commercial fertilizer applied will be counted towards the total recommendation and subtracted from the gross recommendation in the N credit section ("other") of the rate determination sheet. If 35 lbs N are not required to grow the crop, this amount of starter will still be used.

Small grain grazing

Where small grains are fall grazed, additional nutrient needs based upon animal intake or a flat rate (30-50 lbs N/a) may be applied as outlined in the formulas for CSU and Olsen Lab.

In Season N adjustments

The formulas provided represent the maximum amount of N to be applied with advanced planning. It is not uncommon for nitrogen rates to be adjusted during the growing season. The following outlines procedures which may be used to make in season adjustments. Only one test will be used at any given time of plant growth to provide a recommendation. However, additional tests may be used at other stages of crop growth. For instance, it is possible that a soil test at side dressing could indicate the soil is likely to have enough nitrogen to grow a crop, but a tissue test at the reproductive phase of growth could show the plant is now deficient in nitrogen and needs more N.

Pre-Sidedress Nitrate Test (PSNT)

1 foot soil samples are analyzed for nitrate when corn is 6 to 12" tall. Guidance documents from Cooperative Extension, either from CSU or from a surrounding state, will be used to interpret results.

Tissue testing

Plant samples will be analyzed for nitrogen at the appropriate time, and from the appropriate location on the plant for the given crop. The results will be compared with expected nitrogen content for the plant at the specified growth stage. Deficiencies will be managed with additional N.

Leaf chlorophyll meters & near infrared sensors

There are a number of meters on the market which detect the amount of chlorophyll in leaves. By comparing the chlorophyll meter readings from the reference strips to those from the rest of the field, N sufficiency and the need for additional N can be determined. Pennsylvania State University's tool may be used at first side dress when the corn is at the V6-V8 growth stages (Fact Sheet 53: *The Early Season Chlorophyll Meter Test for Corn)* and Purdue University's tool may be used later in the season when the crop is at the V8-V12 growth stages through pollination (Fact Sheet: AY-317-W, *Determining Nitrogen Fertilizer Side dress Application Needs in Corn Using a Chlorophyll Meter*). Interpretation of NIR sensors will be made with the latest available data.

Visual analysis

Visual symptoms are an excellent diagnostic tool to determine nutrient limitations in crop fields. The visual characteristics displayed when plants are nutrient deficient vary by plant species and variety, stage of growth, and severity of the deficiency, and they are well documented and available as a reference from numerous Extension and industry sources. Visual symptoms of nitrogen deficiency may be used to adjust nitrogen recommendations. Many factors will be taken into account to determine the need for nitrogen, including but not limited to unusual weather conditions, previous crop history, source and amount of nitrogen already applied, crop stage of growth, soil physical properties, disease, insect, herbicide injury, and other factors related to root growth. Typically 20-40 lbs N will be recommended.

Nitrogen reference strip

Several reference strips are established through the field where more than enough nitrogen has been applied and is known to not be limiting. These strips are established for comparison to potential problem spots in the field. It is useful to have reference strips when interpreting soil tests and tissue tests. It is crucial that reference strips be established for a chlorophyll meter be calibrated for each field, previous crop, hybrid, fertilizer and/or manure application and differing soil types. If reference strips are utilized, they will be 12,000 square feet for each 60 acres of crop of each hybrid. If the reference strip is developed using commercial fertilizer, it will receive 10-25% above the recommended rate for the field (Purdue University Fact Sheet AY-317-W), and if manure is used to produce the reference strip, it will be applied at 100% above the recommended rate (Iowa State University Fact Sheet PM 2026, *Sensing Nitrogen Stress in Corn*). This latter rate is appropriate because there are many sources of variability when using manure, and the reference strip must be fully fertilized.

APPENDIX E

NUTRIENT MANAGEMENT PLAN TERMS

5) COLORADO PHOSPHORUS INDEX RISK ASSESSMENT

Results from the assessment are provided on the Rate Determination Sheets in Appendix F.

5) PHOSPHORUS AND NITROGEN TRANSPORT (continued)

For land application fields that require a Colorado Phosphorus Index Risk Assessment to be completed, the following applicable best management practices will be incorporated:

(A) Phosphorus-based manure and process wastewater application rates may be made to application sites where the risk of off-site phosphorus transport is scored as high.

(B) No application of manure or process wastewater will be made to land application sites where the risk of off-site phosphorus transport is rated as very high[1].

(C) No application of manure or process wastewater will be made to a land application site where the risk of off-site nitrogen transport to surface water is not minimized.

(D) Where a multi-year phosphorus application was made to a land application site, no additional manure or process wastewater will be applied to the same site in subsequent years until the applied phosphorus has been removed from the site via harvest and crop removal.

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[1] Where the initial assessment of a land application site scores very high, the facility has a three-year period within which to manage the site for the purpose of lowering the phosphorus transport risk assessment rating to high or lower. During this period, manure or process wastewater may be applied to the site at either nitrogen- or phosphorus-based rates.

After completing an initial assessment of the potential for phosphorus and/or nitrogen transport from a land application site to surface water, additional assessments will be made every five years or at the frequency described below, whichever is sooner:

Cause for Re-Assessment	Frequency
Where a crop management change has occurred	For phosphorus - Assess within one year after such a change would reasonably result in an increase in the transport risk assessment score. For nitrogen – Assess within one year after such a change would reasonably result in the nitrogen transport to surface water not being minimized.
Where a phosphorus transport risk assessment score was very high	Assess phosphorus transport risk within six months of intending to apply manure or process wastewater, except where the initial assessment is scored as very high, then there shall be a three-year period within which to manage the site for the purpose of lowering the phosphorus transport risk assessment rating to high or less. During this period, manure or process wastewater may be applied to the site at either nitrogen- or phosphorus-based rates.
Where a nitrogen transport risk assessment reveals that nitrogen transport to surface water is not minimized	Assess nitrogen transport risk within six months of intending to apply manure or process wastewater.

ASSOCIATED RECORDS:

1) Copies of phosphorus/nitrogen transport risk assessments are maintained on-site.

APPENDIX F

NUTRIENT MANAGEMENT PLAN TERMS

5) FIELD NUTRIENT BALANCE CALCULATIONS

See Rate Determination Sheets

Wastewater Application - ıte Determination Sheet

Crop sequence/rotation and year (first is current crop)					
Year	2012	2013	2014	2015	2016
Crop	CS	Trit/Sorg	CS	Trit/Sorg	CS

Field: 1
Farm: JF Cattle

1. Field Information:

Crop: Corn Silage *Crop Year:* 2012 *Acres:* 110
Soil name/texture: Sandy Loam *Previous Crop:* Sorghum Silage

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
	10/25/2011	77.7	53	1172	8.4

P-Index Score 11 ***Application rate based upon*** *Nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P2O5 (lb/a)
a) Expected yield	28 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		245	0
Formula Used:	35+(7.5*YG)		
	Tables 7a-8 CSU Bulletin # 568A		
c) Special nutrient needs above recommendations			
d) Total nutrient needs		245	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	77.7 ppm NO3	280	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	0 10% avail	0	
d) Other: no starter			
e) Total nitrogen credit		280	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		-35	0

Sample ID: _____ **Lab #:** _____

Application method:

b) Expected NH3-N volatilization	%		
c) NH4-N available from manure	lbs/1000 gal		
d) Expected mineralization rate	%		
e) Organic N available from manure	lbs/1000 gal		
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal	#VALUE!	
Recommended manure application rate (a/f)	**Gal/acre**	**0**	
	ac-in/acre	**0.0**	

g) P2O5 available 0.00 lbs/1000 gal **Analysis** _____ lbs/1000 gal **lbs P2O5/acre** 0
h) Additional P2O5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P2O5 lbs/ton x 0.6 or 0.8 = available P2O5)

Predicted method, form, and timing of application: **No application this year**

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Wastewater Application - ate Determination Sheet

Crop sequence/rotation and year (first is current crop)					
Year	2012	2013	2014	2015	2016
Crop	CS	Trit/Sorg	CS	Trit/Sorg	CS

Field: 1
Farm: JF Cattle

1. Field Information:

Crop: Triticale Silage *Crop Year:* 2013 and 2015 *Acres:* 110
Soil name/texture: Sandy Loam *Previous Crop:* Corn Silage

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
		10	53	1172	8.4

***assumes soil nitrate reduced by 245 lbs from previous crop**

P-Index Score 11 ***Application rate based upon*** *Nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P2O5 (lb/a)
a) Expected yield	12 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		204	0
Formula Used:	(YG*.4*2000*0.014/.66) Nitrogen Removal		
c) Special nutrient needs above recommendations:	Double Crop Sorghum Sil, 20 t/a, 9*YG	180	
d) Total nutrient needs		384	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	10 ppm NO3	36	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	84 10% avail	8	
d) Other: no starter			
e) Total nitrogen credit		44	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		339	0

Sample ID: *Pond 5* **Lab #:** *18294*

Application method: Sprinkler

b) Expected NH3-N volatilization	45 %			
c) NH4-N available from manure	0.76 lbs/1000 gal			
d) Expected mineralization rate	30 %			
e) Organic N available from manure	0.21 lbs/1000 gal			
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal		0.5	
Recommended manure application rate (a/f)		**Gal/acre**	**705,273**	
		ac-in/acre	**25.6**	

g) P2O5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P2O5/acre** 248
h) Additional P2O5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P2O5 lbs/ton x 0.6 or 0.8 = available P2O5)

Predicted method, form, and timing of application: **Applied via pivot spring, summer, and fall**

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Wastewater Application - ate Determination Sheet

Crop sequence/rotation and year (first is current crop)					
Year	2012	2013	2014	2015	2016
Crop	CS	Trit/Sorg	CS	Trit/Sorg	CS

Field: 3
Farm: JF Cattle

1. Field Information:

Crop: Corn Silage *Crop Year:* 2012 *Acres:* 72
Soil name/texture: Sandy Loam 2014 and 2016 *Previous Crop:* Sorghum Silage

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
	10/25/2011	28.6	34	491	8.3

P-Index Score 10 ***Application rate based upon*** *Nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P_2O_5 (lb/a)
a) Expected yield	28 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		245	0
Formula Used:	35+(7.5*YG)		
	Tables 7a-8 CSU Bulletin # 568A		
c) Special nutrient needs above recommendations			
d) Total nutrient needs		245	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	28.6 ppm NO3	103	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	84 10% avail	8	
d) Other: no starter			
e) Total nitrogen credit		111	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		134	0

Sample ID: *Pond 5* **Lab #:** *18294*

Application method: Sprinkler

b) Expected NH3-N volatilization	45 %		
c) NH4-N available from manure	0.76 lbs/1000 gal		
d) Expected mineralization rate	30 %		
e) Organic N available from manure	0.21 lbs/1000 gal		
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal	0.5	
Recommended manure application rate (a/f)	**Gal/acre**	**277,838**	
	ac-in/acre	**10.1**	

g) P_2O_5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P_2O_5/acre** 98
h) Additional P_2O_5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P_2O_5 lbs/ton x 0.6 or 0.8 = available P_2O_5)

Predicted method, form, and timing of application: **Applied via flood irrigation spring, summer, and fall**

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Wastewater Application - ate Determination Sheet

Crop sequence/rotation and year (first is current crop)					
Year	2012	2013	2014	2015	2016
Crop	CS	Trit/Sorg	CS	Trit/Sorg	CS

Field: 3
Farm: JF Cattle

1. Field Information:

Crop: Triticale Silage *Crop Year:* 2013 *Acres:* 72
Soil name/texture: Sandy Loam and 2015 *Previous Crop:* Corn Silage

Soil test results	Date	N(as NO_3-N), ppm	P (Olsen), ppm	K (NH_4OAc), ppm	pH
	10/25/2011	28.6	34	491	8.3

P-Index Score 10 ***Application rate based upon*** *Nitrogen*

2. Nutrient Needs:

		N (lb/acre)	P2O5 (lb/a)
a) Expected yield	12 Tons, Lbs or Bu. / Acre		
b) Nutrient recommendations		204	0
Formula Used:	(YG*.4*2000*0.014/.66) Nitrogen Removal		
c) Special nutrient needs above recommendations:	Double Crop Sorghum Sil, 20 t/a, 9*YG	180	
d) Total nutrient needs		384	0

3. Nitrogen Credits:

a) Residual soil nitrate credit* (1 foot for grass, 2 feet for all others)	28.6 ppm NO3	103	
b) Previous legume crop			
c) Previous manure application credit (applic rate x org N x % min)			
Previous Year LBS Organic N Applied	84 10% avail	8	
d) Other: no starter			
e) Total nitrogen credit		111	

4. Recommended Nutrient Application Rate:

a) Total nutrient need minus Total nutrient credit (lb/acre)		272	0

Sample ID: *Pond 5* **Lab #:** *18294*

Application method: Sprinkler

b) Expected NH3-N volatilization	45 %			
c) NH4-N available from manure	0.76 lbs/1000 gal			
d) Expected mineralization rate	30 %			
e) Organic N available from manure	0.21 lbs/1000 gal			
f) Total available N ([c x {1-b}] + [d x e])	lbs/1000 gal		0.5	
Recommended manure application rate (a/f)		**Gal/acre**	**566,063**	
		ac-in/acre	**20.6**	

g) P2O5 available 0.35 lbs/1000 gal **Analysis** 0.44 lbs/1000 gal **lbs P2O5/acre** 199
h) Additional P2O5 needs from commercial fertilizer **0 lbs/acre**

P is 80% available when applied frequently, 60% available when applied infrequently (analysis P2O5 lbs/ton x 0.6 or 0.8 = available P2O5)

Predicted method, form, and timing of application: **Applied via flood irrigation spring, summer, and fall**

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